



# Malaria Burden

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# Outline of presentation

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1. A little bit of History
2. Geographical distribution of malaria
3. Key interventions to reduce malaria burden
4. Challenges

# 1. A little bit of history

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Malaria is a very old disease... ancient Egypt reports the presence of endemic malaria (Tutânkhamon - 1327 before JC)

# 1. A little bit of history (2)

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Charles LAVERAN



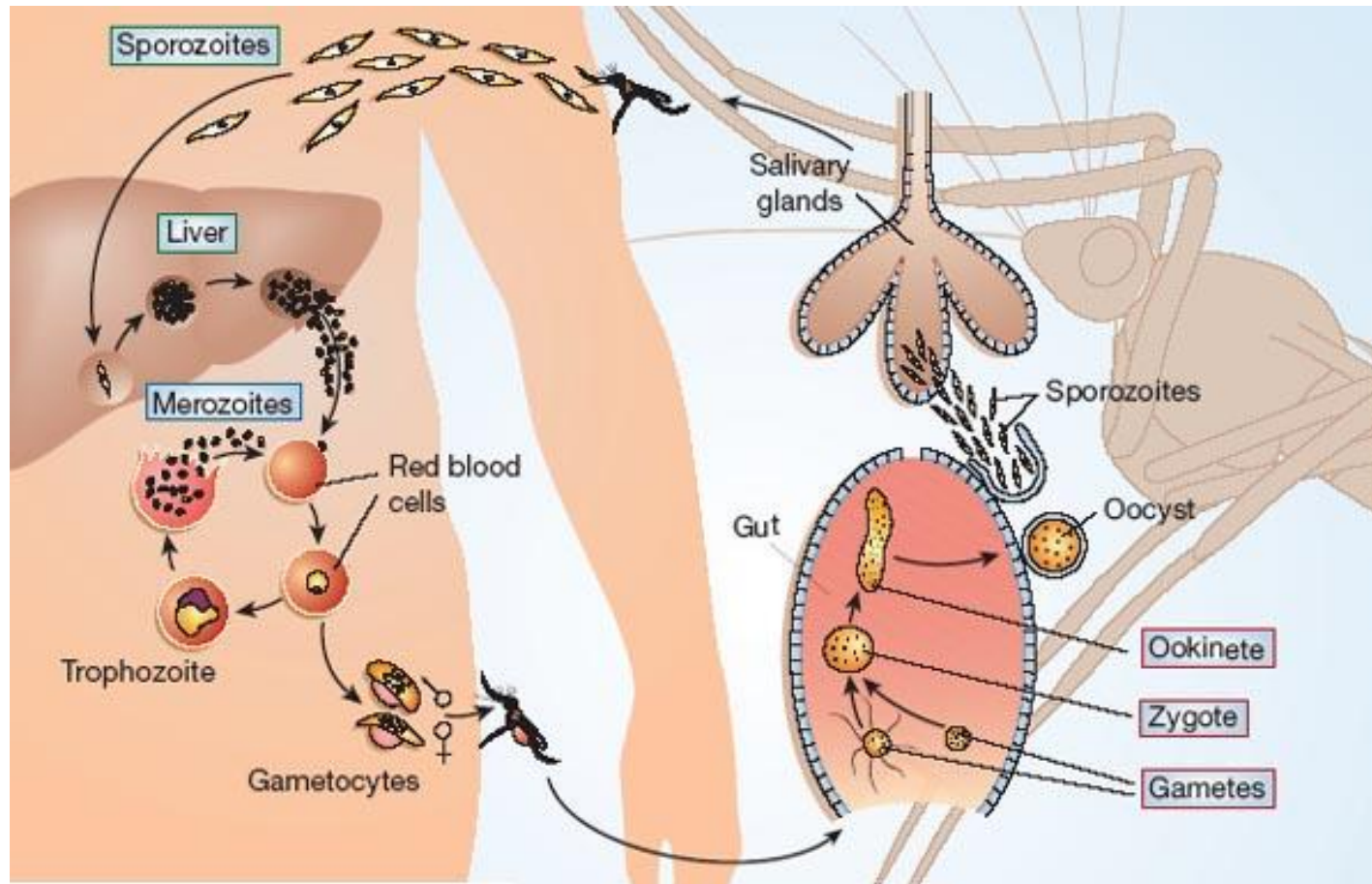
1845-1922

Ronald ROSS



1857-1932

# Life cycle of malaria parasite



## 2. What is malaria?

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- Caused by a protozoaire *Plasmodium* transmitted through *Anopheles* mosquito (*Gambiae*, *Stephensi*, etc...)
- Five species are *P.malariae*, *P.ovale*, *P.vivax* , *P. knowlesi* and *P.falciparum*
- *P. falciparum* causes the most severe form of malaria (cerebral malaria, severe anemia, seizures,...)

## 2. What is malaria? (2)

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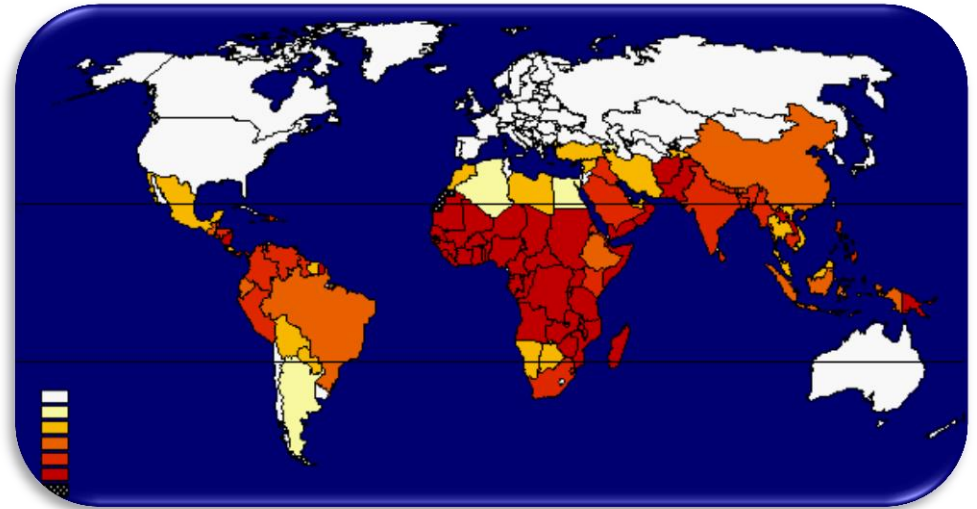
*Plasmodium falciparum* and *Plasmodium vivax* pose greatest public health challenges:

- *P. falciparum* is most prevalent in African continent
- *P. Vivax* has a wider geographic distribution because it can develop in mosquito at higher altitudes, lower temperatures and cooler climates.

## 2. Malaria is a poverty-related disease

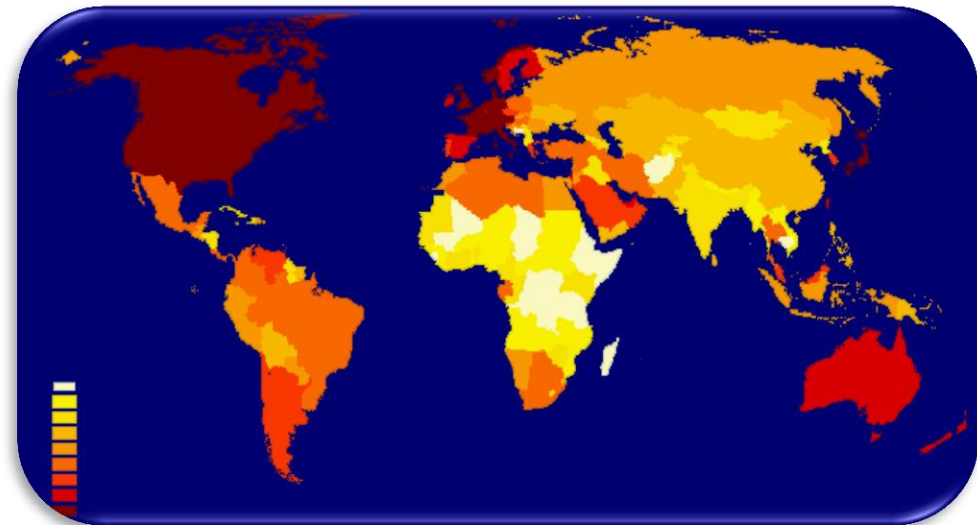
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World malaria distribution



Gross National Product  
(GNP) per capita

(Sachs and Malaney,  
2002)







# 3. Distribution of malaria today



African region bears the highest burden



Countries with high transmission (West and Central Africa)

Countries with low transmission (South Africa, Namibia,,..)

Region of Americas



Argentina, Bolivia, Peru, Guyana, Haïti, ,  
etc.....

# Distribution of malaria today



South East Asia region

(*P.vivax* represents 74%).



Myanmar, India, Indonesia, Korea,

Eastern mediteranean, European & Western pacific region



Djibouti, Sudan  
/ Georgia, Azerbaijan,  
Tajikistan  
/ Papua New Guinea,

# 3. Vulnerable population

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Children under 5 years  
(Poor performance,  
death, etc..)

Pregnant women  
(up to 15% maternal  
anemia, abortion, low  
birth weight, death, )



# Malaria Numbers. Cases

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- Malaria cases: 214 million
- Out of 106 malaria endemic countries
  - 57 reduced malaria incidence by >75%
  - 18 reduced malaria incidence by 50–75%.
- Millennium Development Goal 6 “to have halted and begun to reverse the incidence of malaria” has been achieved.

# Malaria Numbers. Deaths

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- Malaria deaths : 438,000
- Malaria mortality rate decreased by 60% globally between 2000 and 2015
- In children under 5 years decrease by 71%
- **Highest mortality in African region (90%)**

# Key interventions to reduce malaria burden

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# 1. Diagnostic testing

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From 74% in 2005 to 78% in 2014. The global trend is dominated by countries in South-East Asia, particularly India.

The WHO African Region from 36% of suspected malaria cases tested in 2005, to 41% in 2010 and 65% in 2014.



# Prevention & Case management

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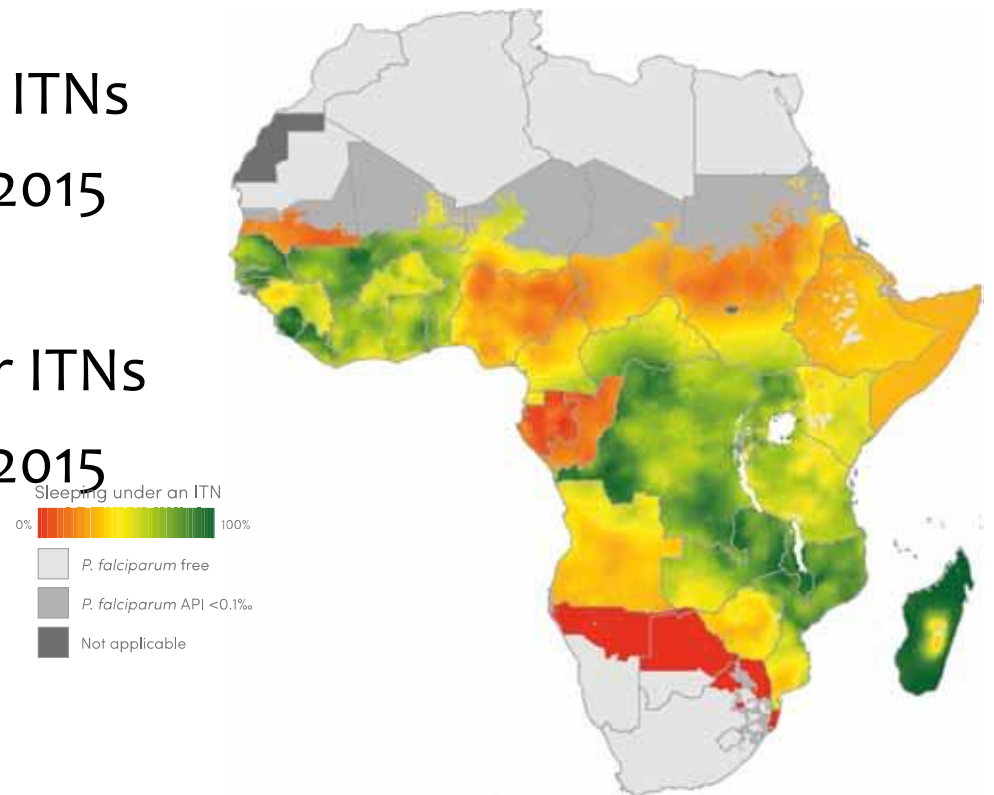
- Increase treatment with ACTs (from **less than 1%** in 2005 to **16%** in 2014)
- Chemoprevention in pregnant women
  - In 2014, **52%** received at least one dose of IPTp, **40%** received two or more doses, and **17%** received three or more doses.
- Chemoprevention in children
  - Sahel region and not fully implemented in the 15 recommended countries

# Vector control



In sub-Saharan Africa:

- Population with access to ITNs
  - 56% in 2014 and 67% in 2015
- Population sleeping under ITNs
  - 46% in 2014 and 55% in 2015
- Indoor residual spraying.
  - 5.7% in 2010 to 3.4% in 2014 ( pyrethroids)



# Impact of key interventions

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Malaria control interventions accounted for **70%** of the 943 million fewer malaria cases occurring between 2001 and 2015, *averting 663 million malaria cases (range: 542–753 million).*

# Financing malaria control and elimination



- Global financing : **US\$ 960 million** in 2005 to **US\$ 2.5 billion** in 2014
- International funding (Global Fund) accounted for **78%** of malaria programme funding (1.9 billion in 2014)
- Most (**82%**) international funding was directed to the WHO African Region



*Anopheles funestus*.ox.ac.uk

## Vector resistance to insecticide

- Since 2010, 60/ 78 countries reporting monitoring data, reported resistance to at least one insecticide in one vector population.
- Pyrethroid resistance was detected in all major malaria vectors.

# Challenges

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- > 80% of *P. vivax* cases in three countries (Ethiopia, India and Pakistan). Need to refine mortality rate due to *P.vivax*.
- Antimalarial drug resistance. *P. falciparum* resistance to artemisinin. (delayed parasite clearance)



BULLETIN #5

## WHO's emergency response to artemisinin resistance

SEPTEMBER 2016

# Challenges

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- Slower declines in malaria in high-burden countries. In 2015, **15 countries accounted for 80% of cases and for 78% of deaths** (Nigeria and Dem Rep of Congo, >35%)
- Gaps in intervention coverage.
- Weaknesses in health systems in countries with the greatest malaria burden.

 Thank you for your attention 